Analysis of Optimal Ratios for Wave Power and Offshore Wind Power Generation

The ideal ratio for the integration of wave energy and offshore wind power generation should be determined based on an in-depth analysis of the specific conditions of the sea area, combined with the results of technical studies. Such a ratio should be able to optimize the complementarity of the two energy sources and ensure that the power generation system operates stably in all weather and sea conditions. The following are some of the key points:

- **Resource assessment**: Firstly, an exhaustive assessment of the wind and wave energy resources in a given region is required. According to the study of resource reserves, the total theoretical reserves of wave energy resources along the coast and offshore of China is about 5.74×10^11kW, which indicates that wave energy has a huge potential for development.
- **Technological complementarity**: Studies have shown that the combination of offshore wave energy and wind energy has a broad application prospect, and the continuous innovation of co-generation systems makes this field full of potential. Through rational technical design, it is possible to realize the complementarity between wind and wave energy in power generation and improve the overall energy efficiency.
- **System design**: When designing a co-generation system, a variety of factors need to be considered, including the choice of numerical simulation methods for hydrodynamics, the balance between computational efficiency and accuracy, and the technical principles and experimental techniques for hydrodynamic control optimization. These design principles will have a direct impact on the final rationing and performance of the system.
- **Economic analysis:** Although technical and environmental factors are important in determining the proportioning, the economy should not be ignored. It is necessary to determine the optimal energy ratio under the premise of ensuring system stability and economy.
- **Policies and regulations:** Policy support and laws and regulations are also important factors affecting the ratio. Government support can promote the development and application of technology, but also need to ensure that the project meets the relevant environmental protection and safety standards.

In summary, the ideal integration ratio of wave energy and offshore wind power generation should be the result of a comprehensive consideration of

resource conditions, technical feasibility, economic rationality, and policies and regulations. With the continuous progress of technology and in-depth research, more accurate and efficient integration schemes are expected to be obtained in the future to achieve the maximum use of ocean energy and sustainable development.